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ON THE REPRESENTATIVES OF THE SEYMOURIAMORPHA,
SUPPOSED PRIMITIVE REPTILES, FROM THE UPPER
PERMIAN OF RUSSIA, AND ON THEIR
PHYLOGENETIC RELATIONS.

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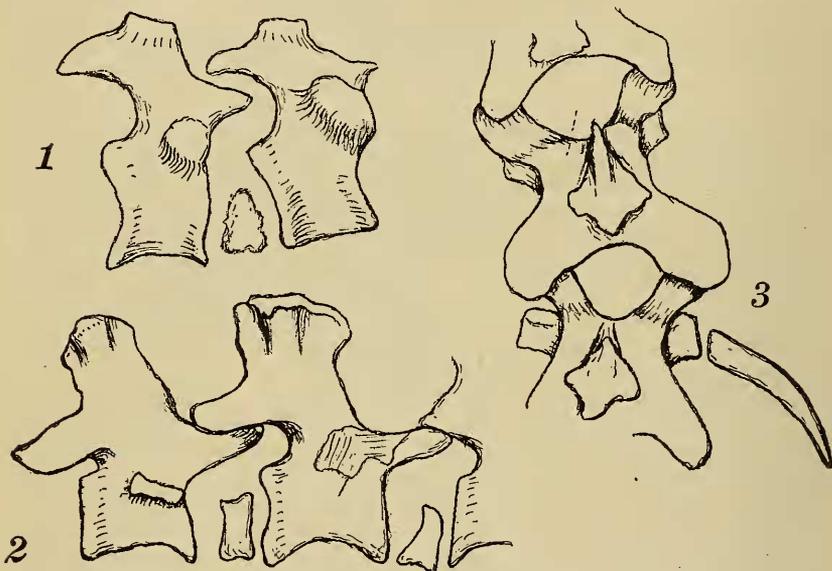
THE genus *Conodectes*, more generally known as *Seymouria*, is one of the most remarkable generalized types known and is generally considered as the most primitive Reptile. Until quite recently this genus, known only from the lowermost Permian of Texas, stood alone. A short time ago (1923), however, Professor Broili described a new genus, *Solenodonsaurus*, from the Upper Carboniferous of Bohemia. And somewhat earlier, the late Professor Amalitzki found some specimens which he recognized as related to "*Seymouria*," in the Upper Permian of North Dvina, Russia, and described them as *Kotlassia*.

Having recently reexamined his material, I have found that it contains two distinct genera. One of them, for which the name *Kotlassia* is to be retained, is very similar to *Conodectes*, since it possesses low spinous processes (text-fig. 1), a long presacral column of 26 vertebrae, and only one sacral vertebra. It differs, however, from that genus by having a more depressed skull (text-fig. 4, 5), a larger post-temporal foramen, and more rudimentary intercentra. The other differs from *Conodectes* by having a short presacral column consisting of 18 vertebrae, by possessing two sacrals, by its massive and long spinous processes, which are knobbed at their tips (text-fig. 2, 3), and by having a narrow, slitlike otic notch. I name this genus *Karpinskiosaurus*, after Professor Karpinski, President of the Russian Academy of Sciences, and consider it as the type of a new family, *Karpinskiosauridae*.

Thus the *Seymouriamorpha* were represented not only in America, but also in Europe, where they survived till the close of the Permian.

In this material I succeeded, in both *Kotlassia* and *Karpinskiosaurus*, in disclosing the stapes, which was hitherto unknown for that group. This bone (text-fig. 4, 5) has the form of a rod, with a slightly S-shaped bend, greatly thickened at its base and tapering distally; the tip is connected with the distal end of the paroccipital bar and terminates in a facet looking toward the otic notch; probably it had a connection with the tympanic membrane. But there is no connection at all with the quadrate, and the tip of the stapes lies far from that bone.

Having such a form as this, the stapes recalls essentially that of the Rhachitomi Stegocephalians and differs greatly from the Cotylosaurlike Captorhinus and, indeed, from all other primitive Reptiles—*Anomodontia sensu lato*, Pelycosauria, Ichthyosauria—in which the stapes has the form of a massive rod abutting by its distal end upon the quadrate and usually connected also with the end of the paroccipital bar. (In later Reptiles, as far as can be judged from existing forms, this connection of the stapes and quadrate is more or less distinctly repeated in the ontogeny.)



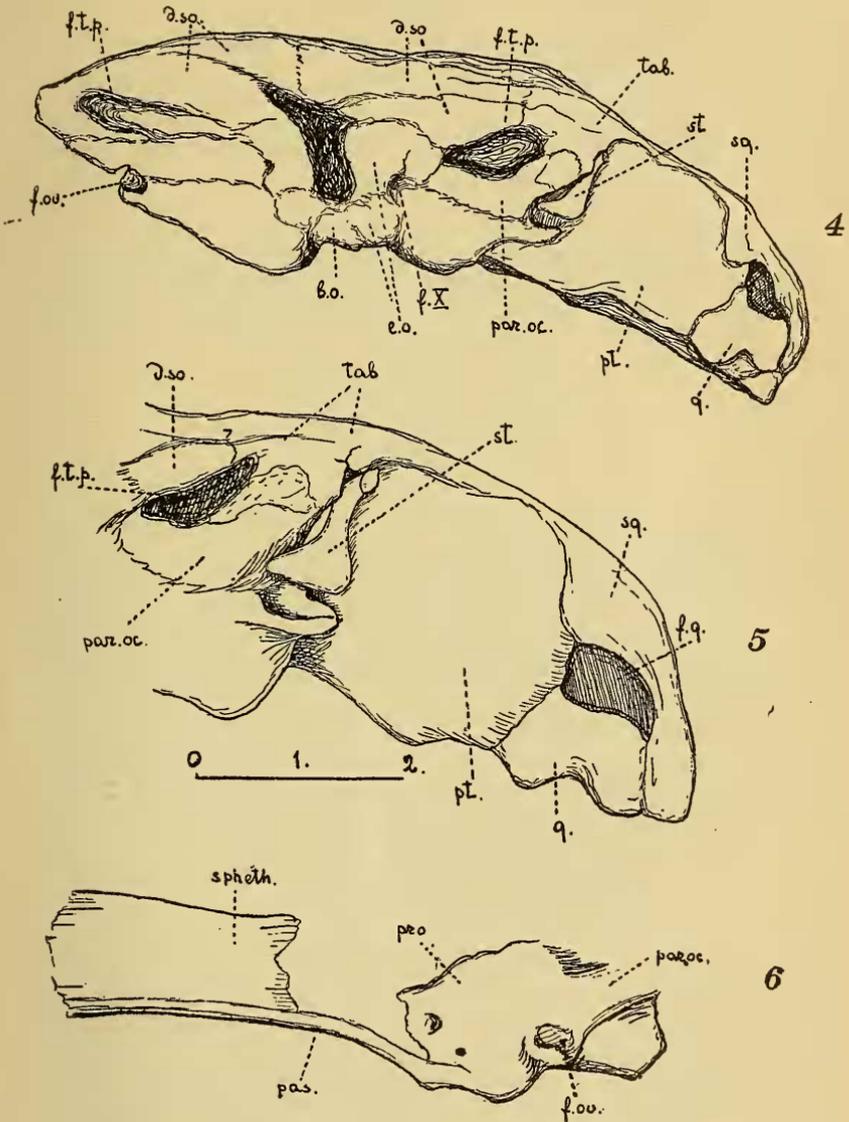
TEXT-FIG. 1. Kotlassia, middle presacral vertebrae.

TEXT-FIG. 2. Karpinskiosaurus, 17th and 18th presacral vertebrae, lateral view.

TEXT-FIG. 3. Same, dorsal view.

These features of the stapes are of prime importance for determining phylogenetic relations. The connection of the stapes with the quadrate, which we find in the primitive Reptiles, is evidently a reminiscence of the ancient hyomandibulo-quadrate junction characteristic of the fishlike ancestors of the Tetrapods. In the Rhachitomi this connection does not any longer exist. This character alone affords sufficient ground for removing the Rhachitomi from the ancestry of Reptiles and Amniotes generally, the Rhachitomi standing in this respect farther from the fishlike ancestors than the primitive Reptiles do. The same advanced condition of the stapes we find in the Seymourians.

Hence, the Seymourians are not only to be removed from the order Cotylosauria, but they cannot be regarded at all as ancestors of the Reptiles. The condition of the stapes characteristic of the primitive Reptiles cannot be derived from that of the Seymourians.



TEXT-FIG. 4. Skull of *Kotlassia*, slightly distorted, occipital view, camera drawing.

TEXT-FIG. 5. Same specimen, otic region, latero-posterior view, slightly enlarged (scale showing centimeters), camera drawing.

TEXT-FIG. 6. Same specimen, brain case, free-hand drawing.

B. o., basioccipital; *d. so.*, dermosupraoccipital; *e. o.*, exoccipital; *f. ov.*, fenestra ovalis; *f. t. p.*, post-temporal foramen; *f. q.*, quadrate foramen; *f. X*, vagus foramen; *par. oc.*, paroccipital; *pas.*, parasphenoid; *pro.*, proötic; *pt.*, pterygoid; *q.*, quadrate; *spheth.*, sphenethmoid; *sq.*, squamosal; *st.*, stapes; *tab.*, tabular.